

# Project 25 Compliance Assessment Program

## Summary Test Report

### Icom IC-F9000 Series Portable Subscribers

#### STR-Icom-F9011-09152011

Device Under Test Description: Portable Subscriber			
Manufacturer	Icom Inc		
Manufacturer Contact	Masaaki Takahashi (425) 450-6043		
Products Name:	IC-F9000 Series Portable Subscribers		
Installed Options:	Hardware	136-174	IC-F9011B 01, IC-F9011S 05, IC-F9011T 10
		450-512	IC-F9021B 21, IC-F9021S 25, IC-F9021T 30
	Hardware Option	UT-125	
	Firmware	Rev. 1.4/1.6	
Installed Vocoder:	Enhanced Full Rate with System Improvements		

<b>Test Description</b>
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance.
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance.
P25-CAB-CAI_TEST_REQ – March 2010 Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability.

<b>Informative References</b>	
<b>Date</b>	<b>Title</b>
March 2010	P25-CAB-CAI_TEST_REQ

<b>Other devices tested with Icom IC-F9000 series radios</b>		
<b>Manufacture</b>	<b>Product Name, Definition, and Unique ID</b>	<b>Installed Options</b>
Harris Corporation	P25 Trunked Infrastructure	Release 6.4.2
Motorola Inc	Motorola ASTRO 25 System	Release 7.7
Tait/EADS	TaitNet P25 / EADS COR P25 Network	EADS P25V11_03E18

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Laboratory Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081016
<b>Date(s) of Test</b>	September 20, 2009 to Feb 28, 2011
<b>Date of Issue</b>	January 10, 2010 to Feb, 28 2011
<b>P25 CAP Laboratory Code</b>	P25CAP081017
<b>Date of Test</b>	June 22, 2009
<b>Date of Issue</b>	July 1, 2009
<b>P25 CAP Laboratory Code</b>	P25CAP081012
<b>Date(s) of Test</b>	July 20-24, 2009
<b>Date of Issue</b>	July 24, 2009
<b>P25 CAP Laboratory Code</b>	P25CAP081015
<b>Date of Test</b>	October 16, 2009
<b>Date of Issue</b>	November 2, 2009

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		TIMCO081016 IC-F9011T TIMCO081016 IC-F9021T	
IC-F9011 VHF (136-174 MHz) and IC-F9021 UHF (450-512 MHz) Potable Conventional Receiver Tests			
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P1
2.1.6	Signal Delay Spread Capability	≥ 50 μs	P1
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P1
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 70 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 70 dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P
2.1.17	Late Entry Unsquelch Delay  No Talk Group or Encryption Talk Group Only Encryption Only Both (on clear of encrypted channel)	≤ 125 ms	P
		≤ 370 ms	P
		≤ 370 ms	P
		≤ 460 ms	P
2.1.18	Receiver Throughput Delay	≤ 125 ms	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		TIMCO081016 IC-F9011T TIMCO081016 IC-F9021T	
IC-F9011 VHF (136-174 MHz) and IC-F9021 UHF (450-512 MHz) Portable Conventional Transmitter Tests			
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.12	Transmitter Power and Encoder Attack Time		
	Transmitter Attack Time	≤ 50 ms	P
	Encoder Attack Time	≤ 100 ms	P
2.2.14	Transmitter Throughput Delay	≤ 125 ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	$2544 \leq f_{dev} \leq 3111$ Hz	P
	Low Level Signal Deviation	$848 \leq f_{dev} \leq 1037$ Hz	P
2.2.16	Modulation Fidelity	≤ 5% (Class A)	P
2.2.18	Transient Frequency Behavior		
	Time Interval t <sub>1</sub> = 5 ms	$ \Delta f  \leq 12.5$ kHz	P
	Time Interval t <sub>2</sub> = 20 ms	$ \Delta f  \leq 6.25$ kHz	P
	Time Interval t <sub>3</sub> = 5 ms	$ \Delta f  \leq 12.5$ kHz	P

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9011T TIMCO081016 IC-F9021T	
IC-F9011VHF (136-174 MHz) and IC-F9021 (450-512 MHz) Portable Trunked Receiver Tests			
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P1
2.1.6	Signal Delay Spread Capability	≥ 50 μs	P1
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P1
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 70 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 70 dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9011T TIMCO081016 IC-F9021T	
IC-F9011 VHF (136-174 MHz) and IC-F9021 UHF (450-512 MHz) Portable Trunked Transmitter Tests			
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.12	Transmitter Power and Encoder Attack Time		
	Transmitter Attack Time	≤ 50 ms	P
	Encoder Attack Time	≤ 100 ms	P
2.2.14	Transmitter Throughput Delay	≤ 125 ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	2544 ≤ f <sub>dev</sub> ≤ 3111 Hz	P
	Low Level Signal Deviation	848 ≤ f <sub>dev</sub> ≤ 1037 Hz	P
2.2.16	Modulation Fidelity	≤ 5% (Class A)	P
2.2.18	Transient Frequency Behavior		
	Time Interval t <sub>1</sub> = 5 ms	Δf  ≤ 12.5 kHz	P
	Time Interval t <sub>2</sub> = 20 ms	Δf  ≤ 6.25 kHz	P
	Time Interval t <sub>3</sub> = 5 ms	Δf  ≤ 12.5 kHz	P

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9011T	
IC-F9011 VHF (136-174 MHz) Portable Trunked Transmitter Tests			
2.3.1	Trunking Control Channel Slot Times (45 ms Slot)		
	Encoder Attack Time	2.0 ms ≤ t ≤ 11.65 ms	P
	RF Power Attack Time	0.0 ms ≤ t ≤ 11.65 ms	P
	RF Turn Off Time	≤ 1.57 ms	P
2.3.2	Trunking Request Time (45 ms Slot)	≤ 167 ms	P
2.3.3	Trunking Voice Access Time	≤ 1000 ms	P
2.3.5	Transmitter Time to Key on a Traffic Channel		
	RF TX time to Key – Working Channel	150 ms	P
	Encoder Transmit Time	150 ms	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9021T	
IC-F9021 UHF (450 -512 MHz) Portable Trunked Transmitter Tests			
2.3.1	Trunking Control Channel Slot Times (45 ms Slot)		
	Encoder Attack Time	2.0 ms ≤ t ≤ 11.65 ms	P2/F1
	RF Power Attack Time	0.0 ms ≤ t ≤ 11.65 ms	P
	RF Turn Off Time	≤ 1.57 ms	P
2.3.2	Trunking Request Time (45 ms Slot)	≤ 167 ms	P
2.3.3	Trunking Voice Access Time	≤ 1000 ms	P
2.3.5	Transmitter Time to Key on a Traffic Channel		
	RF TX time to Key – Working Channel	150 ms	P
	Encoder Transmit Time	150 ms	P

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT- 40018-M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.1	Full Registration			
2.2.1.4.1	Test Case 1 - Valid Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.1.4.2	Test Case 2 – Denied or Refused Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.1.4.3	Test Case 3 – Unverified Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.2	Group Voice Call			
2.2.2.4.1	Test Case 1 – Group Call Granted			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.2.4.2	Test Case 2 – Group Call Denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.2.4.3	Test Case 3 – Group Call Request Queued			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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CAB-CAI_TEST_REQ – September 2009, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit P25-Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT-40018- M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.3	Unit-to-Unit Voice Call			
2.2.3.4.1	Test case 1: Unit-to-unit call with target availability check			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.2	Test case 2: unit-to-unit call with target availability check			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.3	Test case 3: Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment After Target Availability Check			
	Home Configuration	P	P	N/A1
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.4	Test case 4: Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment Before Target Availability Check			
	Home Configuration	N/A2	N/A2	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.5	Test case 5: Unit-to-Unit Call without Target Availability Check			
	Home Configuration	N1	P	N1
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.6	Test case 6: Unit-to-Unit Call Queued without Target Availability Check			
	Home Configuration	N1	P	N1
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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P25-CAB-CAI_TEST_REQ – September 2009, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT- 40018-M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.3.4.7	Test case 7: Unit-to-unit call denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.4	Broadcast Voice Call			
2.2.4.4.1	Test case 1: Broadcast voice call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.5	Affiliation			
2.2.5.4.1	Test case 1: Radio permitted to affiliate with new group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.5.4.2	Test case 2: Radio denied affiliation to new group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.5	Affiliation			
2.2.5.4.1	Test case 1: Radio permitted to affiliate with new group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3



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P25-CAB-CAI_TEST_REQ – September 2009, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT-40018- M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.6	Announcement Group Call			
2.2.6.4.1	Test case 1: Collection of talk groups receive call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.7	Emergency Alarm			
2.2.7.4.1	Test case 1: Emergency alarm			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.8	Emergency Call			
2.2.8.4.1	Test case 1: Emergency call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.10	Encryption			
2.2.10.4.1	Test case 1: Call privacy for encrypted call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.11	Registration Area Roaming			
2.2.11.4.1	Test case 1: Idle Radio			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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<b>Model Class: IC-F9000 Portable Subscribers</b>	
<b>Product Name, Definition and Unique ID</b>	<b>Model Number and Installed Options</b>
<b>VHF</b>	
IC-F9011B VHF Mobile with no keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9011B 01 Option Encryption
IC-F9011S VHF Mobile with limited keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9011S 05 Option Encryption
IC-F9011T VHF Mobile with full keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9011T 10 Option Encryption
<b>UHF (470-512 MHz)</b>	
IC-F9021B VHF Mobile with no keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9021B 21 Option Encryption
IC-F9021S UHF Mobile with limited keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9021S 25 Option Encryption
IC-F9021T UHF Mobile with full keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9021T 30 Option Encryption

<b>Test Case Result Definitions</b>	
<b>No Test Performed</b>	---
<b>Test Does Not Apply to the Test Object</b>	N
<b>Test Object Meets Requirements</b>	P (Pass)
<b>Test Object Does Not Meet Requirements</b>	F (Fail)
<b>Test Object is Not Conclusive</b>	I (Inconclusive)
<b>Comments</b>	
N/A1: Test Case 2.2.3.4.3 is not applicable for Tait infrastructure; see results of test case 2.2.3.4.4.	
N/A2: Test Case 2.2.3.4.4 is not applicable for Motorola and Harris infrastructure; see results of test case 2.2.3.4.3.	
N1: Test Case 2.2.3.4.5 and 2.2.3.4.6 are not supported by Motorola and Tait infrastructure	
N2: Both FNE from Motorola, Tait and Harris do not support Inter-System Roaming. Also Icom subscriber unit does not support it. At result Inter-System Roaming was not tested.	
N3: Icom supported Inter-WACN Roaming. However FNE from Motorola, Tait and Harris do not support it. At result Inter-WACN Roaming was not tested.	
P1: F9000 series radio does not support simulcast	
P2: F9021 (450-512Mhz) passed on high and mid power mode	
F1: F9021 (450-512MHz) Failed on lower power mode.	

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**OMB NO:** 1640-0015

**EXPIRATION DATE:** 04/30/2012

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DHS FORM 10044 – June 2009